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Near Field Communication Based Attendance System

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ABSTRACT

Registering for attendance in education environments is a highly demanding activity as a result of increasing number of students. In most colleges attendance of students plays an important role since the students are graded accordingly and taking attendance for so many students can be painstaking. Thus this project focuses on developing a smart attendance system using NFC that will simplify the attendance process, by simply touching the student's NFC enabled ID card to the lecturer's NFC based mobile device in the class. The attendance will get updated simultaneously to the database during run time. The system is based on NFC Technology and run on mobile as an application.

Keywords — Attendance, Mobile Application, Near Field Communication (NFC).

I. INTRODUCTION

The attendance process normally involves circulating a paper for the students to register their names, or the lecturer calling the names and registering the students either on a paper. It is a time-consuming process as it involves calling a particular student and then filling information accordingly. And after that the student's attendance has to be updated to the college database by the teacher manually, which is again tedious. Imagining the number of students to be from 50 and above, a great portion of the lecture time will be wasted performing this process [1]. So, NFC Based Attendance System is implemented. To solve all the issues, we have implemented an android application based on Near Field Communication (NFC) that will mark the student's attendance with the NFC tag in the ID card; thus, updating the database in real time efficiently. The benefits of this system include eliminating the chance of losing attendance data, different attendance reports can be easily generated by a click of mouse, simplifying the decision making process related to attendance, etc. One of the major distinct characteristics of our proposed system is that the hardware required is minimal.

II. RELATED WORK

In 2008, Nucleus proposed the use of a computerized attendance system, which can eliminate human involvement, human data entry mistake, repetitive work. This system is going to increase productivity, reduced payroll error, and reduced payroll inflation, reduced overtime, retirement of legacy systems, Elimination of paper costs, and which can provide all the reports on demand. In this system, faculty has to take attendance manually, only these records have to be entered into the computerized system. But in this problem of data entry may occur [2]. In another paper the authors proposed a system comprised of using the

Viola Jones algorithm for detecting the human faces and then the detected face is re-sized to the required size, this re-sized face is further processed by using linear stretch contrast enhancement and finally it is recognized using a simple PCA / LDA. Once recognition is done, automatically attendance will be updated in an Excel Sheet along with his name, date and time. An HTML file is automatically updated by our system so that a remote authenticated user can access the attendance file. The main problem in this system is recognized face has to be compared with all the entries in the database [1].In another paper by BIS, they present a commercial system based on RFID for attendance management for schools and colleges. The system can send SMS and email alert to parents/guardians of the students automatically. The student will register at the gate by touching RFID device with their RFID tag and send the data to BISAM server in the school.The server will process the attendance data and send an SMS to the parents/guardians of the absentee student through BISAM SMS gateway server. The system also has Time Manager Software for managing employee's attendance and HR related functionalities. . The problem in this research is there is verification is not done. So proxy attendance may be marked [3]. In 2013, Vishal Bhalla et al, have proposed the attendance system which can take attendance using Bluetooth.In this project,attendance is being taken using instructor's mobile phone. Application software is installed in instructor's mobile phone enables it to query students mobile phone via Bluetooth connection and through transfer of students mobile phone Media Access Control (MAC) addresses to the instructor's mobile phone, presence of the student can be confirmed. The problem of this proposed system is student's phone is required for attendance [4]. In 2010, Seifedine Kadry and Mohamad Smaili has proposed one system. In this paper, a wireless iris recognition attendance management system is designed and implemented using Daugman's algorithm (Daugman 2003). This system based biometrics and wireless technique solves problem of spurious attendance and the trouble of laying the corresponding network. It can make the users attendances more easily and effectively. Main problem in this system is it is too expensive and it is very short distance as well as for every class student has to stand in long line of iris scanner for marking presence [5].

III. TECHNOLOGICAL STANDARD

NFC stands for Near Field Communication. NFC is a short- range high frequency wireless communication technology that enables the exchange of data between devices. NFC is an upgrade of the existing proximity card standard (RFID) that combines the interface of a smart card and a reader into a single device. The main characteristic of NFC is that it is a wireless communication interface with a working distance limited to about 10 cm. [6]. The NFC card used in our system is the NDEF NXP NTAG213 chip which has an Operating frequency of 13.56 MHz and data transfer of 106 kbit/s. They are used in contact less payment systems and allow mobile payment replacing or supplementing systems such as credit cards and electronic ticket smart cards.

IV. PROPOSED METHODOLOGY

This project aims to develop an NFC Based Attendance System that will mark and monitor student's attendance without direct involvement of the faculty which would and uploads student attendance data directly to the Database. The steps in the proposed system are as follows (Refer Fig.1): -

- The professors register themselves by entering their details i.e. Name, ID number, department, semester and password into the mobile application which will be installed in their NFC enabled phones.
- To begin attendance process the professor will login into the application using their ID and

password. After login the teacher will input the subject and time and starts the NFC readerpage.

- The professor then passes the mobile phone to every student to mark their attendance.
- Students have to tap their NFC card on the lecture's smart phone. On tapping the NFC card to the mobile phone the application reads the number and sends this number to the database.
- In the database the student's attendance is recorded for that respective lecture.
- At the end of the lecture the teacher will stop the NFC reader and close the application.
- A website is also created in the proposed system where teachers login using their ID number and password to add, update and delete attendance of a student.
- Students can also create and account to view their attendance for a particular lecture. This way the students and professors can keep a track of the student's attendance.

Thus in the proposed system we will try to minimize most of the flaws of the existing system. It will provide real time tracking of attendance of the students and save time wasted on taking attendance manually.

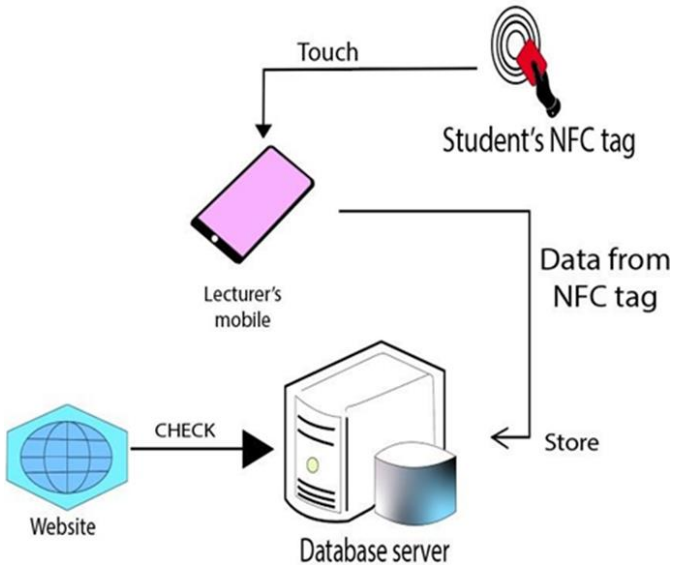

Fig. 1 System Design

V. ADVANTAGES

- There is no paper trail as the entire system is automated.
- Attendance will be directly stored in the database.
- All records are stored digitally.
- There are no manual functions in the proposed system so margin of error is low.
- Being low cost efficient its usage is more convenient.
- Efficiency in tracking and monitoring student's attendance will be excellent and accurate.
- Hardware required is minimal.

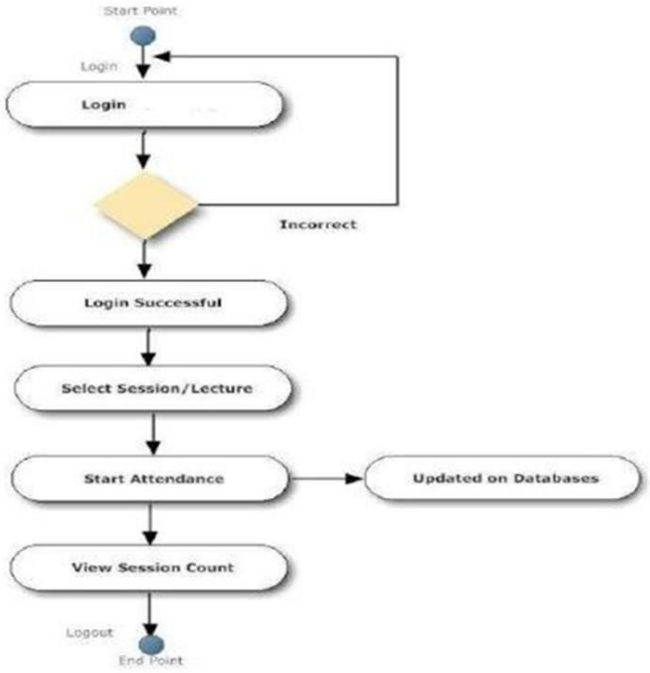

Fig.2 Faculty Activity Diagram

VI. IMPLEMENTATION

This project focuses on two aspects. The first aspect developed in this project is the Mobile application and the second aspect is the website.

A. Mobile Application

The mobile application is specifically designed and developed for the faculty members. The mobile application is developed using flutter in android studio.

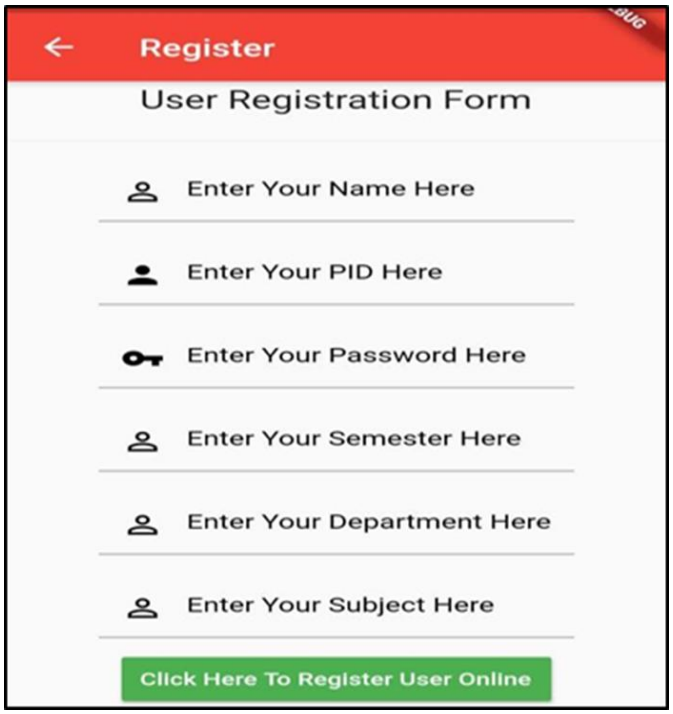

Fig. 3 Faculty Registration Page.

The faculty members have to first register themselves by clicking the registration page and filling in their respective details.

Fig.4 Faculty Login Page

After completing their registration the faculty can then login using their personal ID (PID) and their password.

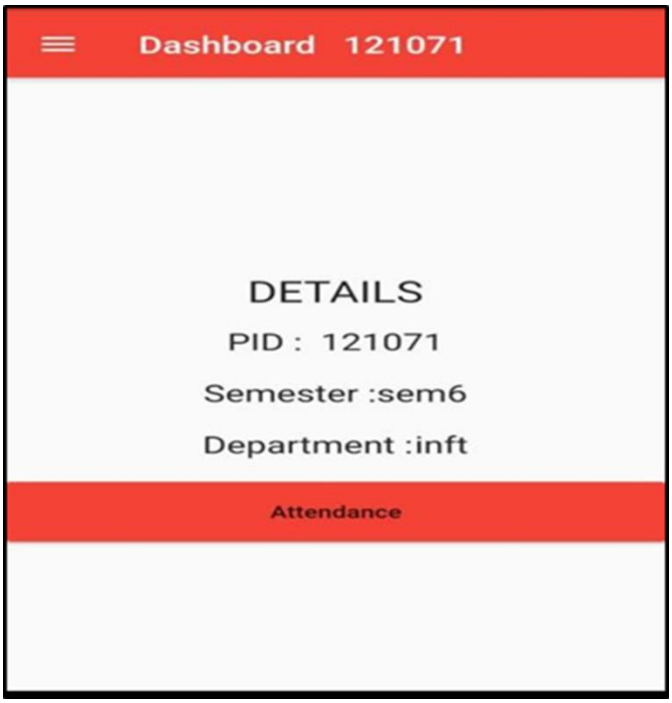

Fig.5 Dashboard

On successful login the faculty will be redirected to the dashboard (refer Fig.5) where the faculty page will be displayed. There is also an attendance button which when clicked will redirect you to the Drop down menu (refer Fig.5).

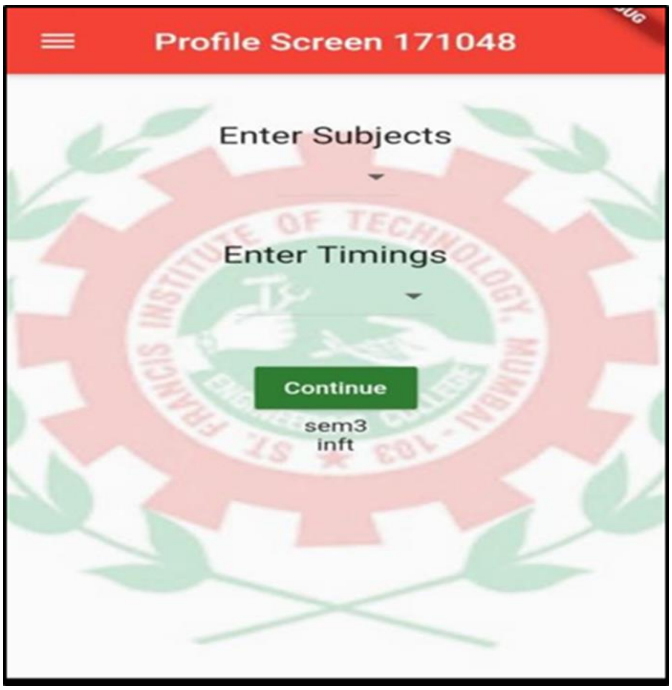

Fig.6 Drop Down Menu

The faculty then has to choose the subject and the timing of the lecture which he/she wants to take attendance for. The semester and department which

the user had filled in the registration page (refer Fig.3) is displayed below the continue button (refer Fig.6).

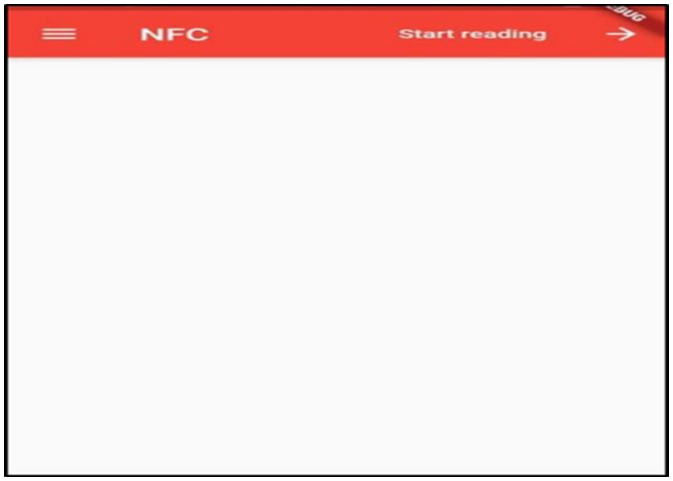

Fig.7 NFC Reader Page

The user is then directed to the NFC reader page(refer Fig.7)

On pressing the "start reading" button the NFC reader is enabled and the faculty can then pass around the phone for the students to tap their NFC ID cards onto the mobile phone.

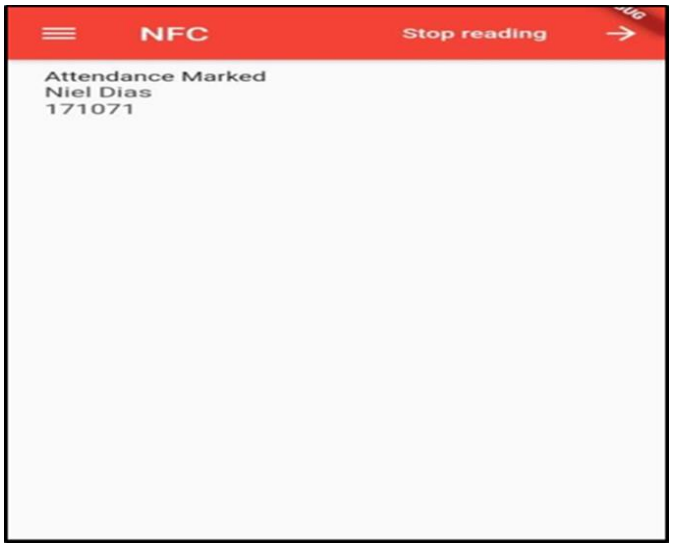

Fig.8 Students Attendance gets Recorded

On tapping the NFC card onto the phone the attendance gets marked and their details i.e. their name and personal ID gets displayed.

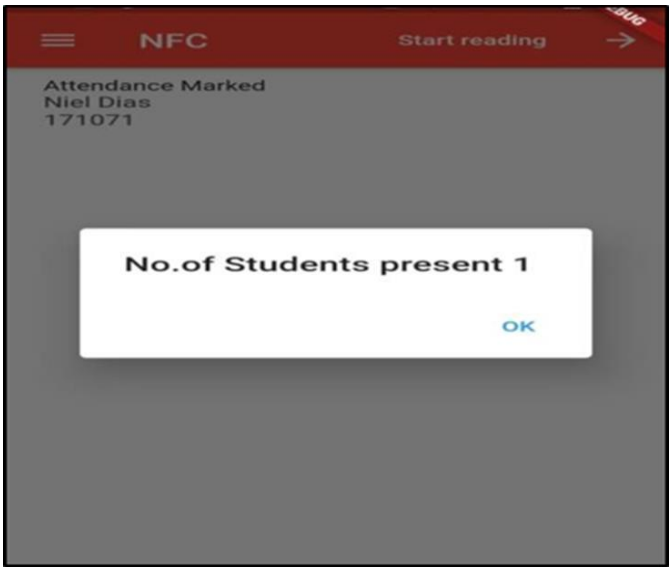

Fig.9 Number of Students Present

Once every students attendance gets marked the faculty can then click the "stop reading" button (refer Fig.8). A pop-up is displayed showing the number of students present for that lecture (refer Fig.9). This data is saved in the database and can be viewed via the website.

B. Website

The website is developed for both the students and the faculty. The faculty can view the attendance for a particular student or for all the students who were present for a particular lecture any students attendance; the students can only view their attendance.

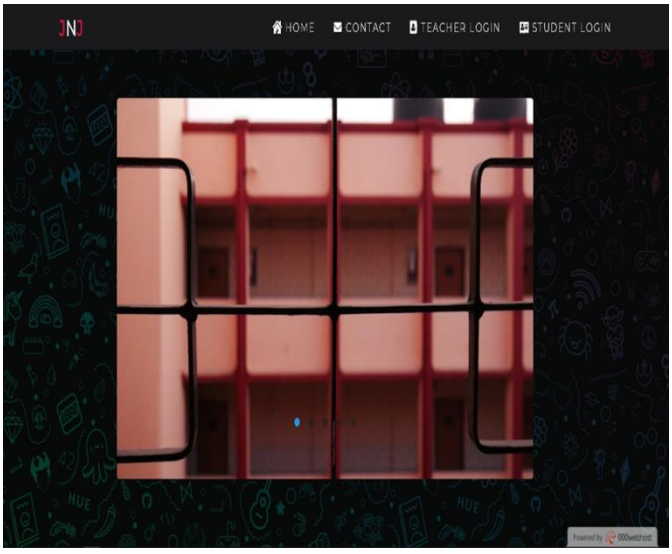

Fig.10. Home page

The home page is common for both the faculty as well as the students. The faculty and students can both login using the Login button in the home page (refer Fig. 10).

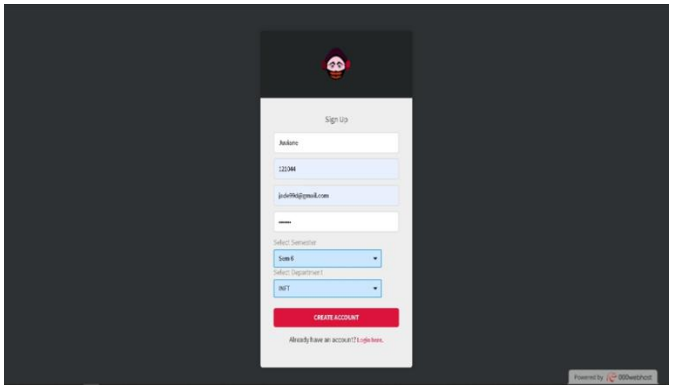

Fig.11 Faculty Registration

The faculty registration can be done either on the app (refer Fig.3) or on the website (refer Fig.11).

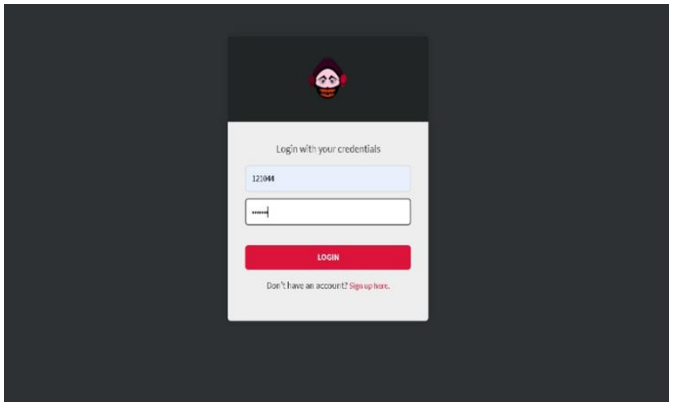

Fig.12 Login

The login module is same for faculty and students (refer Fig.12).

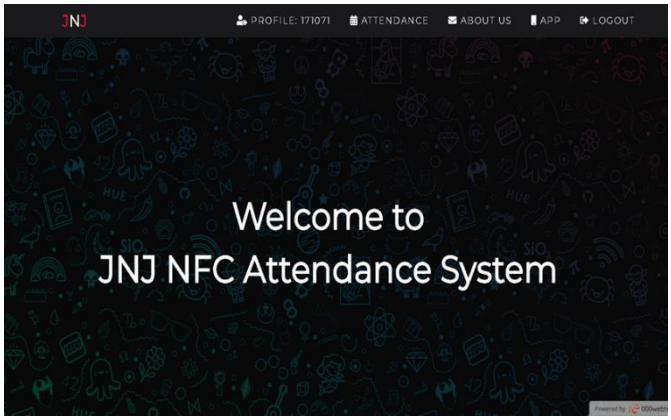

Fig.13 Dashboard Page

On successful login the user will be redirected to dashboard page and a session is created with their Personal ID (refer Fig.13).

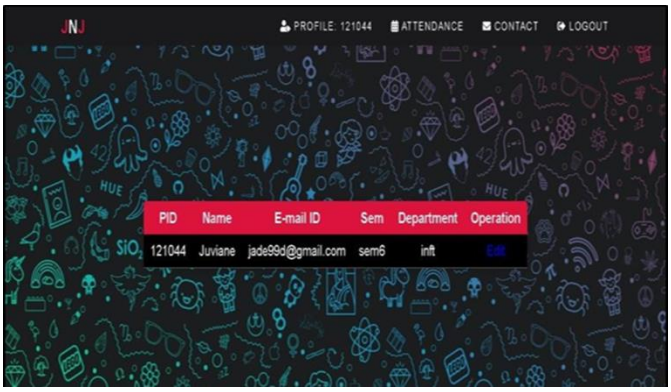

Fig.14 Edit Faculty Details

The faculty can also make changes to their details such as the semester and department by clicking on the edit operation (refer Fig.14).

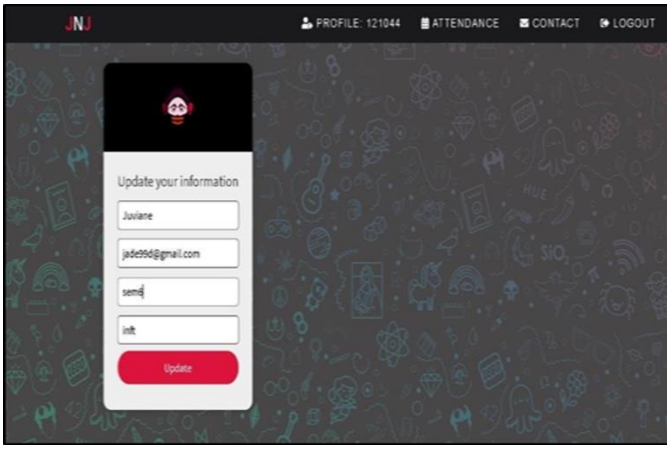

Fig.15 Update Details

The faculty will be redirected to this page after clicking the edit button (refer Fig.15) and can make the required changes.

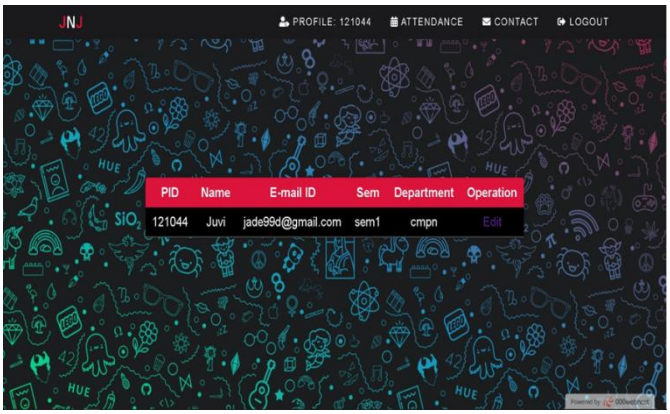

Fig. 16 Updated Records

Once the user clicks on the update button (refer Fig. 15) the changes will be displayed (refer Fig.16).

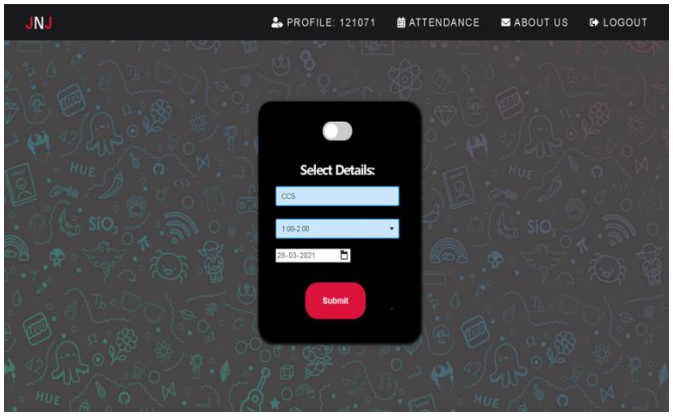

Fig. 17 Checking Attendance of all the students for a lecture

To check the attendance for all the students, the faculty has to enter the lecture,timing and the date for that particular lecture (refer Fig. 17).

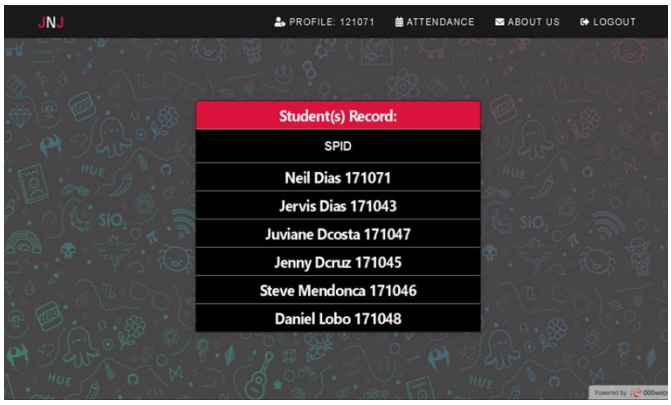

Fig. 18 Students Present

This will show the students present along with their Personal ID (PID).

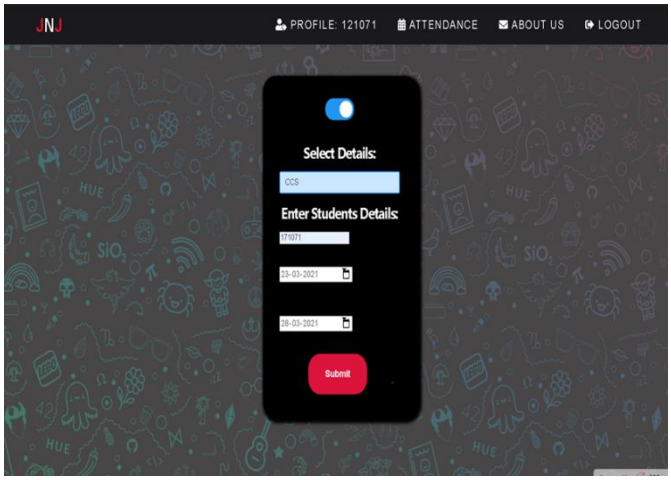

Fig. 19 Checking a Particular Student's Attendance

If the faculty member wants to check the attendance of a particular student, then they must enter the students Personal ID (PID) the subject for which they want to check the attendance, time of that lecture and also the range of the dates from when the faculty wants to check the attendance for.

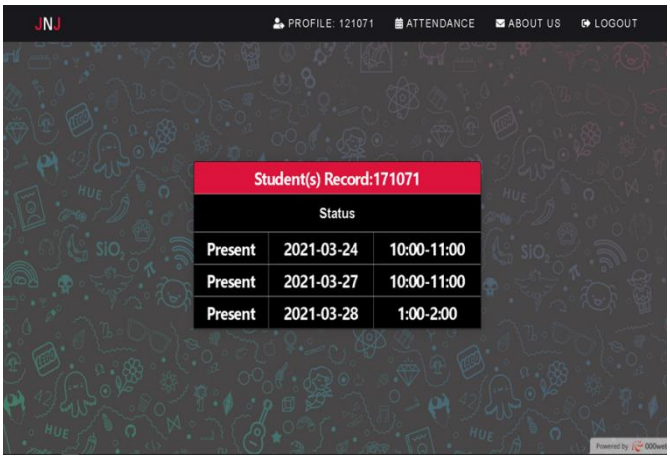

Fig. 20 Student Present

If the student was present then the status will show that the student was present (refer Fig. 20).

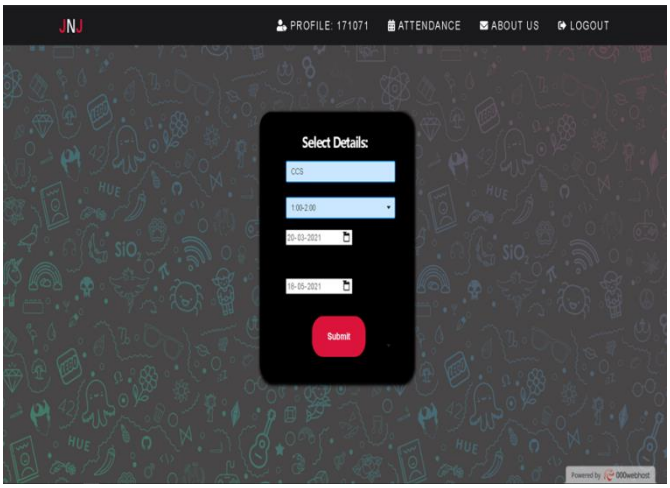

Fig. 21 Students Attendance

If a student wants to check their attendance for a lecture, then he/she needs to choose the subject for which they want to see their attendance for from the drop down menu, the time of the lecture and the dates from which they want to check their attendance from (refer Fig.21).

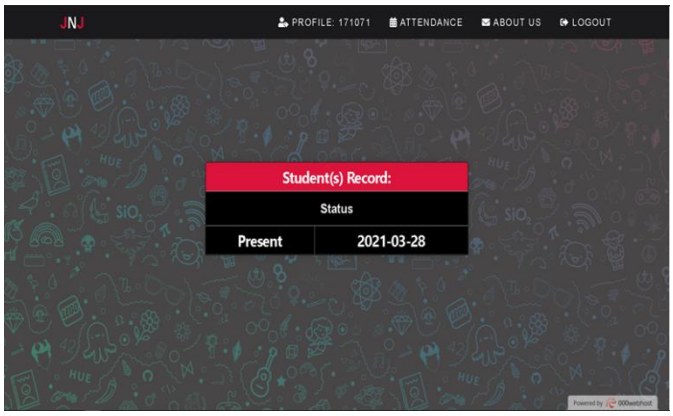

Fig. 22 Student Present for Lecture

If the student was present for the lecture then the student record will display present (refer Fig. 22).

VII. FUTURE SCOPE

- The locking system will be replaced by personalized NFC enabled devices and NFC tags as door locks. Thus NFC will act as a farther step towards the world of automatic devices.
- It can also be used in shopping mall to scan a product and add it into a cart.
- It can be used to track objects using NFC tags.
- It may be used as attendance system for any educational institution.

VIII. CONCLUSION

The NFC system is flexible and very easy to use.Additional security can be added into the cards so as the students cannot write on the NFC card. The NFC cards stored the data such as the PID of the students.This system can be put to use at any educational level and it can replace student Identity cards. As demonstrated, students, can use these cards for ease of attendance. NFC technology is ever growing, and the time has come for us to harness for ourselves, its potential and abilities. The main aim of this project was to demonstrate usage of NFC technology and build a simple attendance system based on it.

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